AMENDMENTS TO THE DRAWINGS

Please correct Fig. 1 of the drawings as marked in red ink on the copy of that drawing figure enclosed herewith by changing the reference designation of the window from "26" to -- 25 --.

REMARKS

In the Official Action the Examiner objected to the drawings because the reference character "26" was used to designate both a window and a hook, as seen in Fig. 1 and described on page 11, lines 18 and 20. Applicant has enclosed herewith a marked-up copy of drawing Fig. 1 in which the reference designation for the window has been changed from "26" to -- 25 --. An original paragraph has been deleted and a substitute paragraph in the Specification added to replace the original paragraph appearing at page 11, lines 14-21. In the substitute paragraph the reference designation from the window has likewise been changed from "26" to -- 25 -- at both recitations of the window at lines 15 and 20. Accordingly, it is believed that both the drawings and the Specification are now correct and the drawing objection is no longer warranted.

In the Official Action the Examiner noted the prior requirement for restriction and Applicant's election without traverse of the Group III Claims 10-14. Therefore, Claims 10-14 are the only claims remaining under consideration in the present application.

In the Official Action the Examiner rejected Claims 10-13 under 35 U.S.C. § 102(e) as being anticipated by the Morse et al reference, a published U.S. patent application (US 2003/91276535 A1). In rejecting Claims 10-13 on this basis the Examiner read the language of Applicant's Claims 10-13 onto elements shown and described in the Morse et al reference. However, Applicant respectfully disagrees with certain important

interpretations and attributions by the Examiner to features of the hoist control shown in the Morse et al reference. Applicant has also amended independent Claim 10 of the application to more clearly denote the distinctions of the claimed invention from Morse et al.

With reference to the drawings of the present application, Claim 10 of the present application, as amended, recites a chain hoist 10 having a casing 12 with a bidirectional chain drive motor 20 (Fig. 1). The motor 20 has a chain drive shaft 22 located within the casing (Fig. 2).

Claim 10 requires a position encoder 50, including a position sensor 48 (Figs. 1 and 3) also located within the chain hoist casing 12. Claim 10 further requires a direct mechanical drive coupling from the chain drive shaft 22 to transmit rotary motion from the chain drive shaft 22 directly to the position sensor 48, also located within the casing 12 (Specification, page 5, lines 13-15, lines 18-19, and Claim 1, line 7). In the embodiment illustrated the direct mechanical drive coupling is formed by the pulleys 36 and 38 and the belt 46 (Figs. 1, 2, and 3; Specification, page 13, lines 12-13; and Claim 14).

Claim 10 goes on to require a tracking controller 54, also located within the casing 12 and coupled to receive digitized electrical position outputs A,B generated by the position sensor 48. The tracking controller 54 is illustrated in Fig. 4B. The operation of the tracking controller is explained from page 15, line 19 to page 16, line 18. Specifically, and

as recited in Claim 10, the tracking controller 54 receives the digitized electrical position outputs generated by the position sensor 48 in response to rotation of the chain drive shaft 22 (Specification, page 8, lines 2-3). The tracking controller 54 provides drive outputs that accelerate rotation of the chain drive shaft 22 from a stopped condition to a rotating condition and decelerate rotation of the chain drive shaft 22 as the position outputs from the position sensor 48 approach an externally determined destination position (Specification, page 7, lines 11-15).

Claim 11 includes all of the limitations of Claim 10 and further requires an alternating current drive controller 60 (Fig. 4B) interposed between the chain drive motor 20 and the tracking controller 54 (Fig. 4B). Claim 11 further requires a digital to analog converter 56 for transforming encoded motor driving signals from the tracking controller 54 from a digital form to an analog form as motor command signals to which the alternating current drive controller 60 responds. One purpose of this arrangement is to control the speed of the chain drive motor 20 with the alternating current chain drive circuit 60, as explained in the Specification at page 16, lines 5-11. Another purpose of the alternating current chain drive circuit 60 is to ensure that the motor 20 is energized before the brake is released, as explained in the Specification from page 17, line 21 to page 18, line 1.

Claim 12 includes all of the limitations of Claim 11 and further requires an optic

isolation module 58 to be interposed between the tracking controller 54 and the alternating current drive controller 60 (Fig. 4B). The electrical encoded motor driving signals produced by the tracking controller 54 are digital signals. The optic isolation module 58 transforms those digital motor driving signals to analog motor actuating command signals. This system provides compatibility between the digital signals received from the tracking controller 54 on line 88 and the input signals that are required for operation of the alternating current drive circuit 60, as explained in the Specification at page 17, lines 7-20.

Claim 13 includes all of the limitations of Claim 11 and further requires a motor stabilization circuit 70 that receives the position signals originally generated by the position sensor 48 and destination signals from an external source. The motor stabilization circuit 70 is also depicted in Fig. 4B and is coupled directly to the alternating current drive controller 60. The motor stabilization circuit 70 overrides the tracking controller 54 only when the position outputs match the destination inputs. The motor stabilization circuit 70 thereby prevents the drive shaft 22 of the motor 20 from slipping when the motor driving signals from the tracking controller 54 command the motor 20 to stop all movement. That is, the circuitry of the motor stabilization circuit 70 in effect looks ahead and "grabs" the motor 20 and overrides the tracking controller 54 when the destination has been reached. This prevents the chain hoist from jiggling due to "hunting" by the tracking controller 54 once the destination has been reached. It also prevents the chain hoist from dropping

slightly when a new destination is programmed into the system (Specification, page 9, line 16 to page 10, line 8). The operation of the motor stabilization circuit 70 is described in the Specification from page 16, line 19 to page 17, line 6.

In the Official Action the Examiner took the position that all of Claims 10-13 are anticipated by the Morse et al reference. However, Applicant respectfully disagrees.

In reading the language of Claim 10 onto the disclosure of the Morse et al reference, the Examiner correctly observed that Morse discloses a motor drive controller for a hoist having a casing with a bidirectional drive motor 24 having a drive shaft. While Applicant believes that the casing in Morse should properly be identified as the house housing 74 shown in Fig. 3, rather than the base plate 30, Applicant acknowledges that the Morse et al reference does show a chain hoist having a casing (Morse et al, paragraph [0042], lines 1-2). While the element designated by the reference number 32 in the Morse et al reference is not actually the drive shaft of the servomotor 24, but is actually the output of the gear reducer 26, nevertheless it is a drive shaft.

However, the Examiner takes the position that the element 48 is a position encoder, including a "position sensor" as required by Claim 10, and refers to paragraph [0040], line 38. While the potentiometer 48 is a position transducer, it measures the deflection of the compression springs 46a and 46b, not the position of the motor drive shaft (Morse et al, page 5, paragraph [0051]). Furthermore, the gears 38 and 52 do not transmit rotary

motion from the drive shaft 32 to the potentiometer 48 (position transducer), as now required by Claim 10. Furthermore, the signals from the potentiometer 48 are not in any way utilized to accelerate or decelerate rotation of the drive shaft, but to the contrary are utilized in determining whether or not the motor has reached a desired speed (Morse et al, Fig. 9, blocks 2160 and 2170, and page 6, paragraph [0058]).

The purpose of the potentiometer 48 is to measure the deflection of the springs 46a and 46b in order to exert a force on the motor to put the weight of the payload 80 into a "float" mode. That is, in the "float mode" the weight of the payload 80 is counterbalanced by the hoist with a closed loop feedback control algorithm, specifically the algorithm depicted and described in conjunction with Fig. 8 (Morse et al, page 4, paragraph [0043] and pages 5-6, paragraph [0056]). The element identified by the Examiner as the "position encoder" i.e., potentiometer 48, is neither connected as required by Claim 10 i.e., directly to the drive shaft, nor does it perform the function required by Claim 10 i.e., deceleration.

The Examiner identifies the tracking controller in Morse et al that is required in Claim 10 as the controller 36 mounted on the base plate 30. The Examiner states that the tracking controller 36 provides drive outputs that accelerate rotation of the drive shaft 32 upon movement of the drive shaft from a stopped condition to a rotating condition, and decelerate rotation of the drive shaft as the position outputs approach an externally determined destination position. The Examiner refers to paragraphs [0052] and [0053] of

not the rotational position of the drive shaft 32. The deflection of the springs 46a and 46b depends only upon the magnitude of the load on the payload hook 78, as is explained in conjunction with Figs. 4 and 5 of the Morse et al reference at pages 4 and 5, paragraphs [0046] and [0047]. Therefore, the potentiometer 48, to the extent that it is considered a "position sensor" senses only the "position" of the left and right armatures 42a and 42b relative to the drive shaft 32 (Figs. 4 and 5), not the rotation of the drive shaft 32 and therefore the position of the load 80 relative to a target position.

Claim 10 of the application requires a tracking controller that is coupled to received digitized electrical position outputs generated by a position sensor and to provide drive outputs which decelerate rotation of the chain drive shaft as the position outputs approach an externally determined destination. The Morse et al reference lacks such a tracking controller and does not perform the function of decelerating rotation of the chain drive shaft as position outputs from a position sensor generated in response to rotation of the chain draft shaft approach an externally determined destination position. Such a tracking controller, namely the tracking controller 54, and the function it performs, are found only in the present application (Specification, page 16, lines 5-11).

The positioning of the load 80 in the Morse et al reference is performed manually by depressing and releasing the up button 98 and the down button 96. Such a manual approach to positioning is simply inaccurate for a great number of chain hoist applications

that require precise position control. Applicant specifically points out such defects in prior art systems, such as that of the Morse et al reference, in the Specification from page 2, line 20 to page 3, line 7.

As held by the Court of Appeals for the Federal Circuit in Kalman v. Kimberly-Clarke Corp., 713 F.2d 760, 771, 218 USP1 781, 789 (CAFC 1983):

> "there is no anticipation "unless all of the same elements are found in exactly the same situation and united in the same way...in a single prior art reference."

Claim 10 of the present application requires the following element which is not present in the Morse et al reference:

"a tracking controller ... which decelerates rotation of said chain drive shaft as said position outputs from said position sensor approach an externally determined destination position".

Consequently, the Morse et al reference cannot anticipate Claim 10 of the present application, nor any of the claims dependent thereon.

In rejecting Claim 12 the Examiner correctly observes that Morse et al discloses that the signals produced by the controller 36 are digital and are converted to analog and that the motor amplifier 34 sends analog signals to the motor 24. However, Claim 12 further requires an optic isolation module 58 interposed between the tracking controller 54 and the current drive controller 60. In contrast, there is no optic isolation module interposed

between the controller 36 and the motor amplifier 34 in the Morse et al reference, nor any suggestion or motivation to provide such a module. The suggestion and reason for including an optic isolation module is found only in the present application (Specification, page 17, lines 7-20). Specifically, the isolation amplifier and converter circuit 58 is employed to provide compatibility between the digital signals received from the tracker controller 54 on line 88 and the input signals that are required for the operation of the alternating current drive circuit 60. The Morse et al reference neither discloses nor suggests the use of any such module.

In rejecting Claim 13 the Examiner states that Morse et al discloses a motor stabilization circuit to hold the load in place when the intended position has been achieved. The Examiner refers to paragraph [0043] at page 4 of the Morse et al reference in this regard.

In the present invention Claim 13 requires the motor stabilization circuit 70 to receive the position outputs from the position sensor 48 and destination inputs from an external source (i.e., a computer). Claim 13 requires the motor stabilization circuit 70 to be coupled directly to the alternating current drive controller 60 and to override the tracking controller 54 only when the position outputs match the destination inputs.

As previously noted, the Morse et al system provides neither position outputs nor destination inputs. Moreover, there is no motor stabilization circuit in the Morse et al

system that overrides the controller 36. Since these features and elements are lacking in the Morse et al reference, that reference cannot anticipate Claim 13.

Furthermore, there is no disclosure or suggestion in the Morse et al reference that would lead one to provide such a motor stabilization circuit. Such a suggestion is to be found only in the present application (Specification, page 9, line 22 to page 10, line 8). Specifically, while the tracking circuitry 54 will hold the chain drive motor at a zero speed when the chain hoist arrives at its destination, without the motor stabilization circuit 70 there is a certain amount of "hunting" that can occur which results in a jiggling of the load. Also, when a new destination is programmed into the system to start operation of the chain hoist motor from a static or stationary condition, there is a very slight delay in the circuit loop through the tracking circuitry. As a result, upon actuation of the chain hoist motor there is a tendency for the chain hoist to drop a short distance, typically about two inches. By overriding the tracking circuitry utilizing the motor stabilization circuit 70 when the chain hoist is at its destination, both of these problems are largely eliminated.

The other references cited in the Official Action likewise fail to anticipate or render obvious Applicant's invention as claimed in Claims 10-13. The Carlson reference, U.S. Patent No. 3,309,066, discloses a winch that has an overload control in the form of alternative torque lever switches 158, 160, or 162. The selection of the operative torque lever switch is determined by one of three alternative selector plugs 184, 186, or 188 (Fig.

9). The operation of the selected switch is controlled by reaching a maximum traction load (Carlson, col. 6, lines 32-68). In contrast, Applicant's motor stabilization circuit 70 overrides the tracking controller 54 only when the position outputs match the destination inputs, as required by Claim 13.

The Johnson reference, U.S. Patent No. 6,547,220, discloses a system for controlling velocity and acceleration as those parameters approach predetermined maximum values (Johnson, col. 4, line 66 - col. 5, line 15). In the present application velocity is controlled by the proximity of the chain hoist relative to a destination.

The Schreyer et al reference, U.S. Patent No. 4,361,312, discloses a system in which a load of a hoist motor 1 is lowered through a small incremental distance by its own weight by temporarily releasing the hoist brake 4 for a predetermined limited time period (Schreyer et al, col. 4, lines 11-28). The chain motor drive controller of Applicant's invention does not operate on this basis.

The Griffiths et al reference, U.S. Patent No. 3,960,362, discloses a pneumatic hoist 10 with travel limits imposed by a pair of limit switches 68, and 70 (Fig. 2). Unlike Applicant's invention, this system is pneumatically operated and driven by an air motor 12 and controlled by a hoist operator through a pendent control 14 (Griffiths et al, col. 3, lines 5-15).

The George et al reference, U.S. Patent No. 6,600,289, discloses a portable three-

phase alternative current power supply that may derive alternating current from a single one hundred ten volt alternating current source, if only a single chain hoist is to be operated. In addition, it may also derive alternating current from a second one hundred ten volt alternating current power source from a different circuit if a second chain hoist is to be operated. This reference discloses a power supply for a chain hoist motor, rather than a control system for such a motor.

The Kazerooni reference, U.S. Patent No. 6,386,513, discloses a human power amplifier 10 for an actuator 12 for lifting a load 25. The human interface subsystem 15 of the end-effector 14 contains a sensor that measures the magnitude of vertical force exerted by the human operator. The controller 20 and the actuator 12 are structured in such a way that a predetermined percentage of the force necessary to lift or power the load 25 is applied by the actuator 12, with the remaining force being supplied by the human operator. The human operator therefore lifts only a portion of the total load.

For the reasons set forth with respect to the Morse et al reference, none of the references, either alone or in combination, anticipates or renders obvious Applicant's invention as claimed in Claims 10-13. As held by the Court of Appeals for the Federal Circuit in the case of W. L. Gore and Associates, Inc. v. Garlock, Inc., 220 USPQ 303 (CAFC 1983):

"There must have been something present in teachings in references to suggest

to one skilled in art that claimed invention before court would have been obvious."

In the present case neither the Morse et al reference nor any of the other references discloses a chain motor drive controller that employs a tracking controller that decelerates rotation of the chain drive shaft as position outputs provided by a position sensor in response to rotation of a drive shaft approach an externally determined destination position, as required by Claim 10. The references also fail to disclose an optic isolation module as required by Claim 12, or a motor stabilization circuit as required by Claim 13. Accordingly, Applicant respectfully requests reconsideration of the rejections and allowance of Claims 10-13.

It is noted that Claim 14 was considered by the Examiner to be allowable if rewritten in independent form. However, it is believed, for the reasons hereinbefore set forth, that independent Claim 10 and intervening Claims 11 and 13 are allowable over the prior art cited. Accordingly, Applicant respectfully requests reconsideration of the requirement for any amendment to Claim 14.

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